

REMARKS

In the Office Action mailed May 16, 2005, the Examiner noted that claims 1-41 were pending, that claims 20, 21, 26 and 17 have been withdrawn from consideration, and rejected claims 1-19, 22-25, and 28-41. Claims 1, 2, 8, 22, 25, 28 and 31-41 have been amended, and, thus, in view of the forgoing claims 1-19, 22-25, and 28-41 remain pending for reconsideration which is requested. No new matter has been added. The Examiner's rejections are traversed below.

On page 2 of the Office Action, the Examiner rejected claims 1-4, 9, 11, 12, 14, 28, 31, 34, 35, and 38-41 under 35 U.S.C. § 102 as anticipated by Hanrahan.

Hanrahan notes that there are three distinct and different methods for 3D painting: parameter-space; screen-space; and tangent-space. The Hanrahan implements the parameter-space. "Since parameter space brushes can be implemented much like 2D brushes in a 2D paint program, that method is used at the lowest level to implement that actual painting into texture maps." Hanrahan discusses placing the brush in the tangent plane and projecting the brush along the normal to the surface. The brush is discussed as being pre-distorted before it is used for painting.

In contrast, the present invention (see claims 1, 22, 28, 31, and 33-41) paints "based on brush orientations that minimize a distortion of a painted texture when displayed on the surface" of the object." That is, present invention uses brush orientation to solve the mapping problem. Hanrahan says nothing about this.

Further, the present invention paints a "brush texture map" onto a "texture map of a surface" (see claims 1, 22, 28, 31, and 33-41). This is very different from Hanrahan where the brush is projected onto the surface.

In addition, the present invention (see claims 1, 22, 28, 31, and 33-41) paints "directly" onto the texture map of a surface (and "without first painting the brush on a two dimensional texture space corresponding to the object" - claim 4). The Examiner asserts that Hanrahan allows direct painting. Hanrahan contradicts this "directness" assertion and notes that (top of page 218 column 1) "Since parameter-space brushes can be implemented much like 2D brushes in a 2D paint program, that method is used at the lowest level to implement the actual painting into texture maps." This means that Hanrahan paints, then updates micropolygons that represent the texture in 3D, and then draws them on the screen. When Hanrahan paints a circle onto a sphere at the pole, because a sphere is heavily distorted at the poles, the user will be

surprised by getting a very oddly distorted shape at the pole instead. This means that the drawing is indirect and that, even for simple shapes like a sphere, the user cannot predict what (and sometimes where) the brush will be drawn. Only a single pixel at the center of the brush will be guaranteed to be drawn where the user clicked "directly on the 3D model". For example, towards the top of the sphere, a circular brush may be drawn but a thin triangular shape will appear on the sphere. In this way, the painting cannot be said to be painting "directly on the surface". With the technique of the invention, a circular brush will always look circular when viewed from the normal of the center of the brush, so, in the language of those "skilled in the art", the invention technique is said to be "direct". For example, this means that in the texture map, there may be a highly distorted circle so that it will be an undistorted circle when viewed back on the surface of the model.

It is submitted that the present claimed invention of the independent claims patentably distinguishes over Hanrahan and withdrawal of the rejection is requested.

The dependent claims rejected over Hanrahan also distinguish thereover. For example, the Examiner asserts that Hanrahan is view independent. Even assuming that this is the case for arguments sake, which we do not agree, the Hanrahan system has the same severe distortion regardless of the view. In contrast, the present invention produces the same minimized distortion regardless of the view (claim 2). As another example, with respect to claim 14 Hanrahan is talking about displacement maps (displacing the geometry based on the intensity of a pixel in a texture map). However, claim 14 is talking about the fall-off area of a brush where, as the surface begins to turn away from the normal at the center of the brush ("based on a normal vector of respective portions of the surface"), the paint intensity is reduced (not as opaque).

On pages 5, 8 and 9 the Examiner rejects the remaining claims over Hanrahan and Daniels or Hanrahan and Morioka or Hanrahan, Daniels and Bossut. Daniels, Morioka and Bossut add nothing to Hanrahan with respect to the features of the invention discussed above.

Further, the Examiner appears to be misreading the teachings of Daniels. For example, the present invention calls for a brush with a cylindrical depth and where painting stops with respect to angle. In this situation the Examiner appears to be comparing a stroke width to a cylindrical depth, very different things. The Daniels width vector is a stroke width (offset from a center), which alters the radius of the brush, not the depth and in Daniels, each brush "stamp" is flat, not cylindrical. In asserting that claims were obvious because Daniels provides a "smooth" process of applying paint, the Examiner misses the point of the claims and thus provides an

inappropriate combination rational. These claims intend to minimize the distance along the normal where paint is applied to reduce paint smears down surfaces that move far from the center of the brush not to provide a smooth paint process of applying paint. In another example, the Examiner also appears to be inappropriately comparing the normal angular distance (an angle) with a width. In a further example, the Examiner appears to be comparing the depth into a scene (that is, how far a brush is from the view) with the brush depth (a cylindrical extension of a circular brush).

It is submitted that the claims are not taught, disclosed or suggested by the prior art. The claims are therefore in a condition suitable for allowance. An early Notice of Allowance is requested.

If any further fees, other than and except for the issue fee, are necessary with respect to this paper, the U.S.P.T.O. is requested to obtain the same from deposit account number 19-3935.

Respectfully submitted,

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